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AMENDMENTS TO THE CLAIMS

Please amend the claims, as follows:

1. (Original) A qubit (quantum bit) circuit, comprising:

a superconducting main loop serially-interconnected with a superconducting subloop, said subloop including two Josephson junctions;

a first coil providing a first flux that couples with said main loop but not with said subloop; and

a second coil providing a second flux that couples with said subloop but not with said main loop.

2. (Original) The qubit circuit of claim 1, further comprising:

a superconducting quantum interference device (SQUID) surrounding said main loop and said subloop,

said SQUID being inductively coupled to said main loop and indicating a state of said main loop as an output signal of said qubit circuit.

3. (Original) The qubit circuit of claim 1, wherein said subloop includes at least one of a twisted, figure-eight shape and a predetermined diameter to achieve a common-mode noise-immunity characteristic.

4. (Original) The qubit circuit of claim 1, wherein said main loop includes at least one of an operating point for said main loop and a shape for said main loop as being a twisted, figure-eight shape, to provide a common-mode noise-immunity characteristic of said main loop.

5. (Original) The qubit circuit of claim 1, wherein said first coil comprises a single loop of conductive material providing a current path for a current serving as a first control input signal.

6. (Original) The qubit circuit of claim 1, wherein said second coil comprises a loop of conductive material interconnected to provide a parallel current path for a current serving as a second control input signal.

7. (Original) The qubit circuit of claim 1, wherein said subloop includes a shape for canceling an effect of said first flux in said subloop, such that said first flux does not couple into said subloop.

8. (Original) The qubit circuit of claim 1, wherein said second coil includes a shape for canceling an effect of said second flux in said main loop, such that said second flux does not couple into said main loop.

9. (Original) The qubit circuit of claim 1, wherein said subloop selectively tunes an operating point of said qubit circuit.

10. (Original) The qubit circuit of claim 7, wherein said shape of said subloop comprises a figure-eight.

11. (Original) The qubit circuit of claim 8, wherein said shape of said second coil comprises a parallel current path for a current traveling therein.

12. (Original) The qubit circuit of claim 1, further comprising:

a Josephson junction in said main loop.

13. (Original) A qubit (quantum bit) circuit, comprising:

a superconducting main loop serially-interconnected with a superconducting subloop, said subloop including two Josephson junctions,

wherein a noise immunity characteristic of said main loop is enhanced by selection of an operating point such that fluctuations in flux affect an eigenvalue of a potential energy function of said main loop to a second order.

14. (Original) The qubit of claim 13, wherein a noise immunity characteristic of said subloop is enhanced by said subloop having a predetermined shape such that a uniform field representing a noise is canceled in said subloop.

15. (Previously presented) The qubit circuit of claim 13, further comprising:

a first coil providing a first flux that couples with said main loop but not with said subloop.

16. (Original) The qubit circuit of claim 15, further comprising:

a second coil providing a second flux that couples with said subloop but not with said main loop.

17. (Original) The qubit circuit of claim 13, further comprising:

a superconducting quantum interference device (SQUID) surrounding said main loop and said subloop,

said SQUID being inductively coupled to said main loop to indicate a state of said main loop as an output signal of said qubit circuit.

18. (Original) The qubit circuit of 13, wherein said subloop includes a figure-eight shape.

19. (Original) The qubit circuit of claim 13, wherein said subloop selectively tunes an operating point of said qubit circuit.

20. (Original) The qubit circuit of claim 14, wherein said shape of said second coil comprises a parallel current path for a current traveling therein.

21. (Currently amended) A method of forming a qubit, said method comprising:

forming a main loop, said main loop including a subloop twisted in a figure-eight shape and having two Josephson junctions;

forming a first drive coil sufficiently adjacent to said main loop to couple a first input signal flux into said main loop; and

forming a second drive coil sufficiently adjacent to said subloop to couple a second input signal flux into said subloop.

22. (Original) The method of claim 21, wherein said second drive coil includes a closed loop shape that provides a parallel conductive path for a current of said second input signal.

23. (Original) A qubit (quantum bit) circuit, comprising:

a superconducting main loop; and

a superconducting subloop interconnected with said main loop, said subloop including two Josephson junctions,

said subloop having a characteristic that a uniform external magnetic field is canceled out in said subloop.

24. (Original) A qubit (quantum bit) circuit, comprising:

a superconducting main loop; and

a superconducting subloop interconnected with said main loop, said subloop including two Josephson junctions,

wherein said main loop is controlled by a first control signal that does not couple to said subloop and said subloop is controlled by a second control signal that does not couple to said main loop.